Periscope

Miscellany

A DISORDER DUE TO EXPOSURE TO INTENSE HEAT, CHARACTERIZED CLINICALLY CHIEFLY BY VIOLENT MUSCULAR SPASMS AND EXCESSIVE IRRITABILITY OF THE MUSCLES. (PRELIMINARY NOTE.) David L. Edsall (Journal of the American Medical Association, December 5, 1908).

The condition described is one that occurs in firemen of stationary engines, ships' stokers and others engaged in the fire-rooms and engine-rooms of merchant and naval vessels; iron-rollers and puddlers, and others engaged in those parts of metal-working that entail exposure to severe heat; in some of those employed in sugar-refineries; and, indeed, so far as the author has been able to learn, in persons generally who are exposed in their occupation to very high temperatures for considerable periods of time, especially when they are obliged to perform severe muscular labor. In such occupations, the temperatures in which the men work are frequently over 150° F.; and, indeed, often much higher than this, occasionally reaching 190° F., or even above the latter point. The disorder may also occur from exposure to a high general atmospheric temperature, though this is probably rare. It is, however, especially common in summer, evidently because the occupational conditions producing it are then intensified.

Its chief characteristics are very painful tonic muscular spasms, involving especially the muscles of the hands, forearms, abdominal wall, legs and feet; though, at times, any or in fact nearly all groups of muscles may be affected. The individual spasms last a half-minute or a minute; they tend to recur very frequently, and are quickly excited by attempts at voluntary use of the muscles. They are also very readily excited by mechanical or electrical stimulation of the muscles, beginning at the point where the stimulus is applied; the pain of this apparently producing involuntary contraction elsewhere, and the latter exciting spasm, which may be widespread. Slight continuous spasm occurs in same cases in some groups of muscles. There is in some cases a remarkable grade of widespread myokymia in the intervals between the severe tonic spasms. The condition, grossly, often resembles tetany; but Chvostek's and Trousseau's symptoms are absent, the active symptoms of an attack are ordinarily only a few hours to two days in duration, and the violent irritability of the muscles, the frequently severe myokymia, and other points distinguish it, especially the conditions of metabolism, which were exactly the same in two cases studied, and quite different from those in any similar disorders, so far as is known. Several physicians, however, have described to the author cases that they had called tetany, but that they subsequently concluded were almost certainly examples of the condition under discussion; likewise, cases that had been previously diagnosed under various other names have been described to him, since his earlier report on the disorder, as being really instances of this character.

The cases vary greatly in severity, occasionally being so violent as to be fatal—probably chiefly from toxemia, as the severe cases appear toxic and most of those seen had albuminuria of toxic characteristics; and the conditions of metabolism are such that severe toxemia must readily occur. Exhaustion also probably contributes largely to the fatal result in some violent cases. The disease seems (from reports given the author by a considerable group of physicians who see many persons exposed to its occurrence) to be extremely common in a number of occupations. The author has seen seven cases in general medical service in hospitals, including two cases that he described in 1904. Previous to the latter year, it had apparently been only very casually mentioned once or twice in medical literature, without having been described as a distinct disorder or studied at all. Since that time, it has been very briefly described by two medical officers of the navy (Beyer and Elliott) as peculiar to men working in the hot parts of vessels. The author's first cases, however, were in men employed on land—as have been all those he has seen since; and his investigations regarding the experience of a large group of physicians show that it is more or less common in a variety of occupations.

It presents none of the characteristic symptoms of heat-stroke. The temperature may not be disturbed, may be moderately elevated, or may be more or less markedly subnormal—the latter especially in the severe cases. Cerebral symptoms have been absent in all the cases accurately known to the author, except in the advanced stages of a few extremely violent cases described to him by others, which were usually fatal. No changes in sensation, no definite alterations in reflexes, etc., that would indicate that any spinal involvement was found. Clinically, the disorder apears to be situated chiefly in the muscles; and the very remarkable conditions of metabolism that were found in two cases studied were such as to make it extremely probable that extensive acute degenerative changes occur in the muscles. This probably indicates the nature of the condition, since similar conditions of metabolism do not occur, so far as any studies have indicated, in central nervous diseases, or as a consequence of the excessive muscular work accompanying spasms due to such causes as tetanus.

It is probable, however, that cases will be found occasionally in which there are symptoms and lesions indicating coincident or secondary spinal and cerebral involvement. Such lesions may of course readily occur, very quickly as a secondary result of the severe toxemia that these patients seem to exhibit (which is probably due largely to their extensive and sudden tissue destruction); also the men who get these attacks are often exposed to gases that are known frequently to produce central nervous lesions, and they may readily get a complex condition due to the combined effects of heat and gases; and further, heat may, of course, readily produce, in some cases, central lesions coincidently with lesions in the muscles. The author has notes of several cases in which central nervous lesions of varied kinds appeared to have been produced by occupational exposure to intense heat, without producing these muscular spasms. Hence it is readily conceivable that the two may occur coincidently.

In characteristic cases of the kind described, however, it seems probable that the most marked and peculiar feature is a muscular disurbance, due to degenerative changes in the muscle-protein. This must be determined by morphological studies of the muscles, or perhaps even more definitely by chemical studies as the latter might show alterations that morphological methods might overlook, for the conditions of metabolism are such as to suggest that there is not simply a general destruction of muscle protein but a splitting off of certain parts of it.

AUTHOR'S ABSTRACT.